MODEL-BASED QUALITY EVALUATION: A COMPARISON OF INTERNET CLASSIFIEDS OPERATED BY NEWSPAPERS AND NON-NEWSPAPER FIRMS

(Research Paper)

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Abstract The Internet has become an important resource for information. The Internet presents information through web pages and hyperlinks. However, this mode of presentation is not always useful for every purpose. Internet searches are designed to locate and to present information more effectively. The efficiency and usefulness of Internet searches are becoming more and more dependent on the design of web applications. In this paper one type of web application was examined – online classified applications. The differences and similarity of classified web applications were investigated. Classified sites were divided into categories based on the operating organization, i.e. newspapers versus independent organizations. Additionally, the newspapers were grouped by circulation size, i.e. large versus small circulation. This paper developed quality attributes for classified applications and used them to test and evaluate 73 online classifieds. The quality criteria that were used for the evaluation included contextual DQ, accessibility DQ and representation DQ. The results show that both the newspaper-owned and independently owned classified sites showed weaknesses in the area of interactivity. Low newspapers circulation predicted a low quality of classified applications but no corresponding prediction was found for newspapers with high circulation.

Keywords: Newspapers, data quality, classifieds, web sites, rental classifieds.

1. INTRODUCTION

This study evaluated the quality of 73 classified web applications, 51 sites that were operated by some of the 100 largest US Newspapers and 22 sites that were operated by independent organizations. Researchers have investigated software applications in many ways. Some research activities have focused on the design of the software interface. These research works assumed that the design of the software interface can enhance the efficiency and effectiveness of user interfaces [1]. In regard to computer interfaces, some researchers have focused on the improvement of the design of computer hardware [2, 3]. Other researchers have studied how hypertext is used to create information for online newspapers [4, 5, 6, 7]. Another strand of research focused on how computers could understand and respond to human intentions and or gestures [8]. The focus of this research is on the interface quality and hence usability of online classifieds for rental properties.

The results of this study are relevant to both the customers and the providers of online classifieds. Hopefully, this study will provide an impetus for the improvement of electronic classified ads. The Newspaper Association of America (NAA) estimates that the market for classifieds ads is $16.8 billion. Almost all of this revenue is from print classifieds. Typically classified ads constitute between 35-40% of the total revenues of a daily newspaper [9]. The NAA also estimates that there are above 1,000 employment, 900 real estate and 500 automotive web sites offering classifieds-type information [10]. From a competitive standpoint every provider of electronic classifieds on the web is competing with providers of both print-based and online classifieds. It is reasonable to expect that high quality online classifieds could provide a competitive advantage. High levels of quality would also benefit users of such services since they would find their information in efficient and cost-effective ways. A contribution of

this empirical study is the identification of the quality levels and measures of quality for online rental classifieds. Additionally, this study identifies quality differences between classified application provided by independent organizations, high circulation newspapers and low circulation newspapers.

2. SOFTWARE QUALITY FRAMEWORKS

2.1. Existing Quality Frameworks

The focus on software quality is becoming more important in all organizations that depend on software products. In the past, only the larger software firms had the resources and the interest to invest in quality improvement processes. In recent times, organizations that have avoided quality assurance efforts have paid a heavy price including costly updates, product returns and bad public image. To rectify these risks, many software firms have embraced quality assurance and implementation processes that rely on the approach of building quality into all aspects of software design and development. System development life cycle (SDLC), prototyping, and computer-based methods [11, 12, 13] are often used as quality improvement tools. The Capability Maturity Model (CMM), developed by the Software Engineering Institute of Carnegie Mellon University, is another tool that firms use to integrate quality into each process of software development [14].

While the approach of building quality into the development process has a lot of advantages, one must still measure or evaluate the quality of a software product before ascertaining the product's value. The first task of this study was to decide on the quality dimensions to use for the software evaluation process of classified applications. The literature provides a variety of quality dimensions for data, data/information quality and information systems quality. Levitin and Redman [15, 16] identified several properties of quality data independent of the properties of software systems. Miller [17] described ten dimensions of information quality from the perspective of organizations dealing in information products. Therefore, Miller's criteria focus on the more general features of information quality. Some researchers have investigated the quality of information systems from the service quality perspective [18, 19]. Many of the studies that follow the service quality based approach use the SERVQUAL dimensions [20]. SERVQUAL was developed to measure service quality from a marketing perspective. DeLone and McLean's [21] works on the quality of information systems are probably the most visible in the area of evaluating the quality of information systems. These authors recommend two dimensions of system and information quality and provide several criteria for the evaluation of service quality of such systems.

A growing field of research is the evaluation of the quality of websites. Examples of work in this area include tools such as WEBQUAL, with its two dimensions of attractiveness and informativeness [22] and the work of Katerattanakul and Siau [23]. These focus on the quality of general web pages rather than on specific web applications. The contribution of our research is the identification and description of the quality of a specific web application that is used by newspapers for their rental classifieds. We decided to base our quality measures on the quality dimensions that were developed by Wang and Strong (1996) [24] rather than on WEBQUAL dimensions. There are two reasons for this choice. First the former dimensions were developed using rigorous statistical analysis. Second, it provides a finer differentiation of quality dimensions than the two dimensions that WEBQUAL instrument provides.

2.2. The Quality Framework Used in this Study

The issue of defining data quality has been prominent in literature in the past decade. As could be expected, each information media has its own peculiarities in regard to how quality is defined. The following working definitions were adapted for this study. Data quality is defined as the set of characteristics that describes the degree to which information meets or exceeds the expectations of users [28]. A data quality dimension is defined as a group of quality characteristics whose components manifest associated properties. The association may be due to the similar manner in which users respond to the characteristics in a group [29] or based on the relationship of the characteristics to a third global factor. The data quality framework for this study is built on the work of Wang and Strong [24]. These authors

identified four quality dimensions in their research: intrinsic data quality (DQ), contextual DQ, accessibility DQ and representation DQ. The dimensions would be defined as follows:

Intrinsic DQ:	What degree of care was taken in the creation and preparation of information?
Representation DQ:	What degree of care was taken in the presentation and organization of information for users?
Accessibility DQ:	What degree of freedom do users have to use data, define and/or refine the manner in which information is inputted, processed or presented to them?
Contextual DQ:	To what degree does the information provided meet the needs of the users?

3. DESIGN OF THE EVALUATION INSTRUMENT

3.1. Hypothesis

In general, one would expect that as one moved away from classifieds with poor quality to those with high quality that the level of interactivity, search configurability, information representation and multimedia features would also increase. Prior research findings were instructive in the formulation of the hypothesis of this paper. Tankard and Ban [31] concluded that online sites essentially reproduced the content of print newspapers with token interactive options. This conclusion was also supported by Schulz [30]. Hypothesis 1 was deduced from these research results.

Hypothesis 1

Generalist organizations, such as newspapers operated sites, would tend to have classifieds with lower overall quality than those that are operated by specialist organizations, such as independent classifieds operators.

1a. The contextual quality of newspaper classifieds would be lower than that of independent newspapers.
1b. The accessibility quality of newspaper classifieds would be lower than that of independent classifieds.
1c. The representation quality of newspaper classifieds would be lower than that of independent classifieds.

The second hypothesis was based on the belief that newspaper organizations have multiple priorities among which the distribution of news has the highest priority. These organizations could therefore be expected to treat classifieds not as a highly interactive form of information rather as another category of "news". In contrast, most independent sites have one priority, which is the marketing of classifieds. One can therefore expect that these organizations would be more likely to pay for more interactive and high quality classifieds.

Hypothesis 2

The circulation size of generalist organizations, i.e. newspapers with larger daily circulation, would predict the quality comparability between newspapers and independent classifieds:

2a. Newspapers with larger circulation would have classifieds of comparable quality to those of the independent classifieds.
2b. The quality of the classifieds sections of newspapers with smaller daily circulation would be significantly different from those of the independent classifieds.

The premise of hypotheses 2a and 2b were based on the result of prior studies [29] that showed that the size of organizations does predict the level of quality of their online services.

3.2. Quality Dimensions for this Study

Table 1 shows a full description of all the steps involved in the creation of classifieds. In Step 1, tools are provided for the owners of rental assets to create, compile, edit and electronically send an ad to the operator of a classified web. During Step 2, the operators of the classifieds edit, review and download an ad into their databases and web site. The user initiates interaction with the downloaded information

during Step 3. This involves activities such as registering for site access, creation of login names and passwords, and accessing the classifieds section. In some cases, unregistered members could skip this step and come back to it later, after they have found an interesting ad. In Step 4, which is often broken into two sub-steps, the user defines the attributes of the geographical area of the rental property being sought and then proceeds to define the attributes of the property. In Step 5, the results of a search and the features needed to manipulate the results are also provided, if available. A user would be able to interact with the results in Step 6 and conclude the search in Step 7 by printing, saving or sending results electronically to themselves or anyone else. Users, who initially omit Step 3, might go back to it at this phase of the search.

This study focused on the data quality issues occurring in Steps 3-6. Steps 1 and 2 were omitted from this study because we knew that the intrinsic data quality dimension, which is impacted by these two steps, is always an important factor to consumers. Since this was a laboratory test with limited testers, and intrinsic data quality is better evaluated using multiple testers, we chose to reserve the evaluation for a future research. In future, a study that would involve multiple test subjects would be used to verify the assumption that intrinsic quality dimension is important for classifieds. Step 7 was also excluded for the obvious reason that it would be better to use test subjects to test the features. The quality evaluation instrument for this study was, therefore designed to cover the dimensions of contextual, representation and accessibility DQ.

3.3. Quality Measures for Research Instrument

Table 1 summarizes the variables that were included in the quality evaluation instrument. The variables are, for the most part, self-explanatory. Under contextual DQ, the instrument was used to gather information about the method in which users define rental ads, the means by which users define their preferred location and the methods by which the computer searches for the matching ads.

Data Quality Dimension	**Variables included in instrument**
Contextual DQ	*Search methods available:* - Distances - Places Search variables (defining property ad): **- Bedrooms** **- Date available** Search variables (defining property location): - Mixed and fixed counties and neighborhoods - Multiple counties can be selected per search
Accessibility DQ	*Accessibility of data results:* - Availability of sorting - Number of variables that can be used for sorting results
Representation DQ	*Representation quality of results:* - Uniformity of listings - Precision of listings

Table 1: Description of the research instrument items/variables

Procedural Steps	**Procedural Steps**
Step 1. Agents and owners submit ads offline or online to third parties or newspaper agents.	*Step 4.* Visitors enter information about the geography, property and amenities (if the website permits such flexibility otherwise the process continues with step 7).
Step 2. The submitted ads are verified, reviewed and inputted in a computer system for online publication.	*Step 5.* The results of the search is presented to the user and tools are made available to ease the browsing process
Step 3. Individuals seeking rental properties visit the classifieds section of an online web to preview the available ads.	*Step 6.* The visitor is offered tools that would permit him/her to manipulate, refine or modify results that the application presents.
Step 4. Visitors enter information about the geography, property and amenities (if the website permits such flexibility otherwise the process continues with step 7).	*Step 7*. The visitor views the presented matching results (pre-selected or user-defined) and decides on the next step of action.

Table 2: Description of the process used by web-based classified advertising firms

The accessibility DQ dimension of the instrument measured the degree of convenience with which results could be manipulated and refined, as well as, the ease with which one could interact with the search results. The variables included in the representation DQ section of the survey measured the scope of data and of the variety of the functions offered to the user. These quality criteria and items were finalized based on a pre-study of a few online classifieds. As a result of the pre-study, the quality evaluation instrument was modified to include several additional variables. The items added after the pre-test process under the section on search methods under Question 1, were Newspapers and Other items. For Question 2, the following items were added: keywords and priorities. Under Question 3, the possibility of searching through search results was added.

4. METHOD

4.1. Sample

This exploratory research was the second segment of a two-part study. The data analyzed came from both the previous and current research investigations. The first part of the research was on the classified web sites of the 100 largest newspapers in the U.S. [29]. The purpose of this research was to compare the online classified quality of the larger newspaper organizations to that of the smaller organizations. The size and the demographics of the first research sample was based on the structure of the U.S. daily newspaper market. After a sample of online newspaper websites was analyzed, it was apparent that the evaluation of the 100 largest US newspapers rather than a random sample would generate more useful results. Furthermore, evidence in literature suggests that smaller newspaper organizations were less likely to have online classifieds due to limited resources and skills [27]. The 100 newspapers studied covered 38 out of the 50 US states. The largest newspaper in the study had daily circulation (in 1999) of 1,671,530 and the smallest newspaper had a circulation of 101,948 (in 1999). Out of these 100 websites, 51 websites were identified as being unique to the newspaper organizations that operated them. The classified sites that were dropped from the sample were eliminated because they were products of identifiable software-houses that had been customized for several newspapers. (Some of the online classifieds eliminated in newspaper category and were used as part of the independent organization sample.) The research sample includes only one software version of each "customized" classified product. Table 3 shows the structure of the population used to form the first sample (for newspapers). It also shows that 92% of the US newspaper market has a circulation of 100,000 or less. The sample used in this study (51 websites) was taken from the first investigation and included the high end (top 7.07%) of the US market. The second research sample included 32 classified web sites that were operated by independents. Twenty-two of these sites were useable. The selection of the second sample was done in a random manner

using two Internet search engines. The sites eliminated in this category were those that lacked sufficient data, were inaccessible to nonmembers, and those that dealt only with vacation rentals. Table 3 shows a breakdown of the 73 classifieds that we evaluated for this study.

Circulation	Under 50,001	50,001-100,000	100,001-250,000	Over 250,000
Number of Newspapers	1,244 (83.88 %)	134 (9.03%)	65 (4.38%)	40 (2.69%)

Table 3: Description of parent population: US daily newspapers market (1999) [27]

Web sites operated by newspapers	51 (70%)
Third-party classifieds visited	32
Useable sample for third-party classifieds	22 (30%)

Table 4: Breakdown of the web sites evaluated

5. FINDINGS

5.1. Comparison of Quality Features of Newspapers and Independent Classifieds

This section provides a summary of the results of the research and is organized show the summary results for each of the investigated features.

The scope of search methods provided for the definition of geographical locations

Five items of the instrument were used to compare classifieds that were operated by newspapers to those operated by independent organizations. The purpose of these items was to document the level of contextual quality provided for the definition of geographical locations of desired rental properties. The five items presented here are: the use of distances, the use of names of places, the use of zip codes, the use of newspaper names and the "other" category. The results revealed that the independents were better than the newspapers on all items but "the use of newspaper names".

Method	**Newspapers (N=51)**	**Independents (N=22)**
Distances (combined with places)	2%	14%
Use of the name of places	43%	86%
Zip codes	4%	27%
Newspaper names	6%	0%
Other (e.g. street names)	4%	36%

Table 5: Scope of search methods offered for defining locations (multiple responses possible)

It was not surprising that the independents did not include newspaper names. Eighty-six percent of the independents permitted users to search through the use of the names of places, in contrast, only 43% of newspapers sites offer this features. A third of all independents permit their users to search through the inputs in the "Other" fields, e.g. street names, while only 4% of the newspaper classifieds offer this feature.

Searching based on the name of places was the most popular method used. This method is effective, especially when a map of an area is provided for the user. All the other items such as newspaper names, zip codes, distances listed were less commonly used. The results provide some evidence that very few sites combine the use of name of places with other methods such as distances. This combination provides an advantage, especially for users who view their commute time as a decision criterion. These users could make a more informed decision than would be possible with the use of "name of places" item alone. The results indicate that classifieds operated by independents tend to provide a wider variety of search features for defining a location than those operated by newspapers.

The scope of fields provided for the description of rental ads or objects

An important feature of every online classified section is the availability of tools with which a user can define the rental property that she or he is seeking. The study results revealed that independents offer about the same scope of features as those operated by the newspapers. Some features are more frequently offered by independents than the newspapers (see Table 6). The "property type" variable occurred most often for the newspapers group, while rent per month (86%) and number of bedrooms (82%) had the highest frequencies for the independents. Interestingly, the two groups had opposite emphasis on three items. Whereas newspapers used rent per month and the numbers of bedrooms less frequently, the independents used them more frequently. The property type was common, whereas the size of property, number of rooms, realtor fees, type of lease and date the rental property were rarely used. Based on the scope of items provided for the definition of the apartment being sought, a user would be more likely to experience more targeted and relevant hits if he or she used the independent site, than if one used a classified website operated by a newspaper.

Search fields	Newspapers (N=51)	Independents (N=22)
Number of bedrooms	31%	82%
Number of bathrooms	22%	36%
Property type	73%	32%
Size of property (sq. ft.)	2%	0%
Number of rooms	0%	0%
Rent per month	27%	86%
Date available	0%	0%
Realtor fees	2%	5%
Type of lease	0%	5%

Table 6: Scope of search variables offered (multiple responses possible)

The scope of tools provided for the limiting of search neighborhood of rental property

Classified websites provide search tools that allow their users to exclude zones or combine multiple geographical zones for a property search. Table 7 describes the degree of flexibility that each group offered in defining/limiting the scope of geographical searches.

Search fields	Newspapers (N=51)	Independents (N=22)
Mixed and fixed counties and neighborhoods	20%	5%
Multiple counties can be selected per search	24%	23%
Only one county/neighborhood or all neighborhoods can be used	16%	27%
Multiple cities per county can be used	6%	27%
Multiple cities in multiple counties can be used	8%	27%

Table 7: Scope of search fields used for describing neighborhoods (multiple responses possible)

The results showed that a high proportion of the web sites in both groups do not offer this highest level of flexibility in which users could select multiple cities in different counties. The ideal scenario would be a classified website that permits a user to select a state first and then allows for the selection of specific neighborhood(s) from a list of all possible areas. Finally, the system would permit the user to select the particular cities in all selected neighborhoods that should be included in the search (i.e., from a list of all cities in each neighborhood). Seventy-three percent of the independents and 86% of the newspaper classifieds do not offer this feature. Additionally, 20% of classifieds operated by newspapers used 'fixed and pre-determined' aggregation of geographical entities, such as counties, neighborhoods and city names, for defining geographical zones. Overall, most online classifieds do not offer their users the tools needed to refine searches appropriately. Both groups revealed a low level of flexibility and precision in the definition of geographical zones. The results from the "low precision" searches would contain a greater number of classified than if the system had been designed to offer more specificity.

The degree of accessibility of search results

The degree of accessibility of the results, produced by online classifieds search, to users varies. Accessibility, in this context, describes the scope of the tools that are provided to enable a user to interact more meaningfully with search results that are generated after a rental property search. Poor accessibility is especially problematic when there is a large number of classified in the search results Tools such as sorting functions, page skip-browsing and selective processing tools were investigated. Tables 8 and 9 summarize the accessibility of the websites studied. The results in Table 8 show that about 49% of newspaper classifieds and 68% of the independents did not offer any sorting features. However, a higher proportion of newspaper owned sites permitted their users to sort using one variable (37%) and two variables (8%). The independents that permitted sorting allowed users to sort with more than three variables (32%). In contrast, only 6% of the newspapers offered sorting with three or more variables. The larger the number of possible variables, the greater the flexibility provided. In summary, a slightly higher proportion of newspapers offered sorting features than did the independents. This suggests that classifieds provided a low level of accessibility to the search results. If one combines the low specificity level of search criteria with the low degree of accessibility through sorting functions, it could be concluded that classifieds would often generate unnecessary results for the user, which can not be removed from results through sorting.

Degree of sorting provided	**Newspapers (N=51)**	**Independents (N=22)**
No sorting options available	49%	68%
Sorting with 1 variable possible	37%	0%
Sorting with 2 variables possible	8%	0%
Sorting with 3 or more variables possible	6%	32%

Table 8: Sites offering sorting functions for results

There are additional features that make it easier for users to interact with search results. These features include the indication of the number of matches or hits and the total number of the search-result page, a hypertext linking function, a function that allows users to select and compile ads, and the feature that allows users to search through their search results. The availability of these features would enhance the accessibility of a classified site.

Criteria	Newspapers (N=51)	Independents (N=22)
Total number of hits is indicated	82%	73%
Total number of results pages is shown	31%	41%
Hypertext based browsing possible	24%	55%
Highlighting and compiling of listings possible	51%	45%
Searching within results possible	2%	5%

Table 9: Scope of accessibility quality features on web sites (multiple listings possible)

The most common feature was the estimation and presentation of the number of hits (i.e., classifieds meeting the search criteria); 82% of newspapers and 73% of independents offered this feature. Half of the newspapers and 55% of the independents do not permit the selection and compilation of interesting ads that are presented with the search results. About half of the independents offered hypertext-based browsing of multiple-page search results and also, showed the total number of pages. Neither of the groups permits their users to search through search results. On the whole there is room for the improvement of the accessibility DQ in about half of all the classified sites investigated.

The level of representation data quality of web sites

Table 10 summarizes the items that were evaluated in regard to the representation quality of search results. These items included the uniformity of listings, and also the precision or degree of

specificity of each listing. In the ideal case, a listing with a high degree of precision would have precise attributes such as only one rental property per ad and exact rental costs, for example $2000 is precise while $2000-$3500 is not precise. This criterion is important because it provides increased benefits to users in the sorting process. Representation quality also includes information tools that permit users to view a map of the location of the rental property. Additionally, representation quality can include the ability to view the floor plans and layouts, neighborhood information, and detailed list of the available amenities of the rental property.

Criteria	Newspapers (N=51)	Independents (N=22)
Uniformity of content of listings	2%	77%
Precise listings	4%	50%
Separate section/feature for viewing amenities	6%	45%
Mapping function	6%	41%
Inclusion of floor plans	6%	32%
Inclusion of neighborhood information	71%	36%

Table 10: Scope of representation quality features on web sites (multiple listings possible)

As shown in Table 10, the classified websites of independents were richer in this information than those of the newspapers, with the exception of the provision of neighborhood information. Seventy-seven percent of the independents had uniformity in their ad listings while only 2% of the newspaper ads had this criterion. Half of the independents offered precise rent prices in contrast to 4% for newspapers. Pictorial information, maps and floors plans, were provided in almost half of the independent sites but hardly at by the newspapers (6%). Based on these results, the independent sites seem to be much richer in content and presentation tools than the newspaper web sites. However, there is substantial room for improvement for about 90% of all newspaper sites, and about 60% of independents!

5.2. Development and Analysis of Quality Scales

The survey instrument provided the means to collect data about the features of classifieds sites. This collected data was used to create the quality scales for this study. Table 11 describes the content of each of the scales. A scale score was calculated by adding the constituent items of the scale. Each item has a maximum of value of 1. For example, if a scale contains 6 items its maximum score would be 6. The relationship between scale and its items was deducted from the online search process of users. Seven separate scales were developed. These were the location description scale (4 items), the apartments description scale (7 items), the rental conditions description scale (3 items), the location aggregation scale (5 items), the sorting features scale (4 items), results navigation scale (5 items) and the content and presentation quality scale (6 items). These scales were then used to test the hypotheses of the study.

Data Quality Dimension	Scales Developed
Contextual DQ	*Location description scale (4 items):* *Apartments description scale (7 items):* *Rental conditions description scale (3 items):*
Accessibility DQ	*Location aggregation scale (5 items):* *Sorting features scale (4 items):* *Results navigation scale (5 items):*
Representation DQ	*Content and presentation quality scale (6 items):*

Table 11: Overview of the scales developed (abbreviated version)

Hypothesis 1

This hypothesis involved the comparison of the average values of all scales for the newspapers (N=51) and the independent classifieds (N=22). The statements of the hypothesis were as follows:

1a: $CQ_I >= CQ_N$ 1b: $AQ_I >= AQ_N$ 1c: $RQ_I >= RQ_N$

where: N: represent classifieds of newspapers and I: classifieds operated by independent operators. CQ: Contextual quality; AQ: Accessibility Quality; RQ: Representation quality.

For the test, we are comparing all the means at once. The comparison of the individual rating of each variable would be presented in the next section. The null hypotheses states that the mean values of all quality scales of independent operators would be higher than those of the newspapers. The significance level ($\alpha = 0.05$) is 95%.

Ho: $\mu_{Ii} >= \mu_{Ni}$ for each i= 1, 2, , 7.

Table 12 shows that the mean values of independent classifieds were higher than those of newspapers on all but the sorting features scale. The results of the paired t-tests showed that the difference between the two sets of means were significant ($t_{critical}$ = -1 .67 , df = 71). The t-values were calculated under the assumption of unequal sample variances (v_I and v_N). Based on the results shown below, all the t-values were higher than the critical value, except for the sorting features index. Hypothesis 1 and its components, such as hypotheses 1a, 1b and 1c, were thus generally supported by the results.

Quality Scales	**Newspapers (N =51)**	**Independents (N = 22)**	**v_N Variance Newspapers**	**v_I Variance Independents**	**T-values**
Geographic location descriptor	0.67	2.14	0.82	1.23	49.46
Rental apartments descriptor	1.33	2.36	1.85	1.76	19.053
Rental conditions descriptor	0.02	0.09	0.02	0.15	2.53
Location aggregation selector	0.59	1.09	1.16	1.16	10.42
Sorting features	0.82	0.82	0.36	0.20	-11.89
Results navigation	1.69	2.18	1.57	1.40	6.02
Content and representation	0.84	2.82	1.10	2.94	77.34

Table 12: Average values for each scale

Hypothesis 2

In order to test the second set of hypotheses, the sample for the newspaper classifieds was divided into two groups. The newspapers were sorted by circulation size. The cut off point was the newspaper classified as rank 25 in a sorted list. The first 22 elements of the sample were labeled as the "large circulation" group.

	Scales	Mean	Standard Deviation
Pair 1*	BLOC	2.2727	0.88
	LOC	1.4545	0.91
Pair 2	BAPART	2.5909	1.05
	APARTD	2.2727	1.69
Pair 3	BCITYSEL	1.3182	0.99
	CITYSELE	1.1364	1.39
Pair 4*	BSORT	1.9091	1.01
	SORTINDE	1.0909	0.68
Pair 5	BINTER	2.3182	0.83
	INTERACT	2.1818	1.40
Pair 6*	BCONQUAL	3.3636	1.56
	CONTQUAL	1.3636	1.39
Pair 7	BRENTC	.0909	0.42
	RENTCOND	.0455	0.21

Table 13: Variances for paired samples (Independents vs. large circulation newspapers)

In the second half of the sample the data with rank 28 to 49 were labeled as the "low circulation" group. A paired-t test analysis between the raw scale values of each of these groups and the corresponding values for independent classifieds was conducted. The B-variables, such as BLOC, represent scales of independent classifieds. Appropriately, hypothesis 2a and 2b were examined using a two-tailed test. As shown in table 14, out of the seven scales only in three cases (see the asterisks in Table 14) could the null hypothesis, i.e. that there was no difference between the quality of the larger newspapers and that of the independents, be accepted. Hence, there is insufficient evidence that the size of larger newspapers predicted the quality of web sites. Tables similar to Tables 13 and 14 were used to test the validity of the null hypothesis for hypothesis 2b. The null hypothesis posed was that the quality of smaller newspapers was equal to those of the independents. Based on the computed values, all the t values were outside the critical value region, we had to reject this hypothesis. The quality features of smaller circulation newspapers were found to be significantly different from those of the independents on all quality scales. Hypothesis 2b was therefore supported by the results of the study. These results could be interpreted in terms of the impact of low circulation. Due to the fact that smaller newspaper organizations have low circulation and hence small readership, the size of their classifieds ads would be smaller than that of larger organizations.

	Scales	95% confidence Interval		T values
		Lower	Upper	
Pair 1	BLOC-LOC	.211	1.42	2.806
Pair 2*	BAPART-APARTD	-.73	1.37	0.628
Pair 3*	BCITYSEL-CITYSELE	-.57	.94	0.499
Pair 4	BSORT-SORTINDE	.31	1.32	3.367
Pair 5*	BINTER-INTERACT	-.51	.78	0.439
Pair 6	BCONQUAL-CONTQUAL	1.01	2.98	4.215
Pair 7	BRENTC-RENTCOND	-.17	.26	0.439

Table 14: Paired samples statistics independents vs. large circulation newspapers

These firms also tend to have less capital resources. This suggests that an investment in software just for the classified ads would seem to be a low priority venture for them. It was expected that a corresponding relationship, though opposite, would be true for newspapers with large circulation size, but this was not completely supported by the data. This is most likely due to other mediating variables. Newspapers seem to set low expectations for interactivity when they commission programmers to create their classifieds. Also, since there are yet no commonly shared standards for the design of classifieds,

programmers creating these applications still show similarity across-the-board (both for independents and newspapers) in regard to their neglect of some quality attributes of classifieds. In other words, a web programmer may avoid interactive and broad quality features regardless of the organization for which she or he is working. Another possible mediating variable could be a lack of broad quality awareness on the part of the firms that pay for classifieds applications. The lack of involvement of the end-users could also be responsible for the absence of quality features that this study found missing on most classifieds. These issues could be explored by further studies.

6. CONCLUSIONS

This study compared the quality of the classifieds operated by independent firms (specialists) to that which were operated by newspaper organizations (generalists). This study evaluated the accessibility, contextual, representation and content quality of the sites using a laboratory-based approach. The study included 51 newspaper-operated classifieds and 22 independently operated ones. The results showed that the overall quality of classified sites operated by newspapers was significantly lower than the quality of the classifieds that were operated by specialists. The study further revealed that quality differences between the specialists and the generalist (newspapers) were more pronounced for newspapers with smaller circulation size. Additionally, this study showed that interactive features were missing from most sites. Although low circulation size seemed to predict low quality of the classifieds web sites large circulation size did not predict the presence of interactive features. The results suggest that specialists, such as independent classifieds operators, provide a broader range of quality features for their users, than the newspapers.

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